# Abstracts from the 2014 Western Vascular Society Annual Meeting

### The Effect of *p27$^{kip1}$* on Arterial Remodeling in Response to Hind Limb Ischemia

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**Objective:** The natural response to peripheral arterial occlusive disease secondary to atherosclerosis is enlargement of collateral arteries; however, the molecular factors that control collateralization are not well understood. Recently, a genetic polymorphism was identified in the gene *p27$^{Kip1}$* (p27), which affects human response to arterial injury. Previous studies have shown that overexpression of p27 inhibits vascular endothelial and VSMC proliferation and angiogenesis. To test the hypothesis that p27 affects collateral artery development after ischemia, we performed in vivo and in vitro experiments using p27$^{-/-}$ mice and wild-type (wt) mice.

**Methods:** In vivo studies were performed on p27$^{-/-}$ (n = 10) and wt (C57BL/6, n = 4) female mice. Hind limb ischemia was induced by left femoral artery ligation. The mice were followed up weekly by laser Doppler perfusion imaging of the foot pads until euthanasia at 28 days postoperatively. Microcomputed tomography (microCT) scanning of both hind limbs was performed after euthanasia. Aortic smooth muscle cells (aoSMCs) were isolated from p27$^{-/-}$ and wt mice. Scratch assays to test migration were performed under growth arrest conditions and assessed at 20 hours. A gel contraction assay was also assessed after 20 hours. Statistical analysis was done with Student *t*-tests. Data are presented as mean ± standard error of the mean.

**Results:** The p27$^{-/-}$ mice reperfused more effectively than wt mice by laser Doppler perfusion imaging starting from day 7 (ischemic/nonischemic ratio, 0.33 ± 0.02 vs 0.25 ± 0.02; $P < .05$) and continuing through day 28 (0.45 ± 0.04 vs 0.31 ± 0.04; $P < .05$). MicroCT scanning showed that the diameter of collaterals in the nonischemic legs for both groups was ~70 ± 20 μm. The collateral diameters increased more in p27$^{-/-}$ mice than in wt mice (172 ± 19 μm vs 130 ± 18 μm; $P < .05$). The Fig shows a representative microCT for a ligated p27$^{-/-}$ leg vs a wt leg. The p27$^{-/-}$ aoSMCs migrated more (79% ± 5% vs 56% ± 6%; $P < .05$) and caused more gel contraction (18% ± 5% of the initial area vs 43% ± 4%; $P < .05$) than wt aoSMCs.

**Conclusions:** p27$^{-/-}$ mice develop significantly greater collateralization after femoral artery ligation. p27 inhibits collagen gel contraction in addition to inhibiting aoSMC migration. These in vitro assays will be used to identify key molecular pathways needed for the effect of p27 on collateralization.

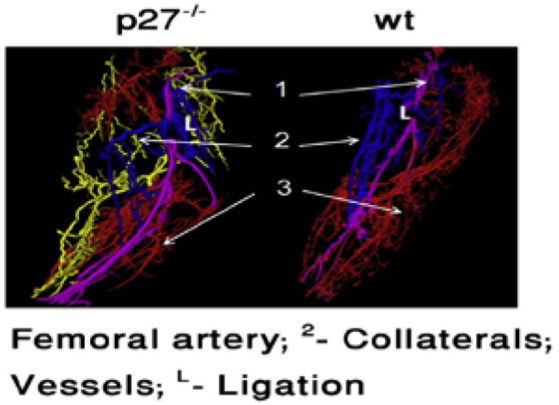


**Fig.** Collaterals diameter increase in the absence of p27kip1.

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### The Impact of Vein Harvesting Technique on Wound Complications and Graft Patency after Infrainguinal Arterial Bypass

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**Objective:** This study investigated the effect of vein harvesting technique (VHT) on wound complications and graft patency after infrainguinal arterial bypass.

**Methods:** The Vascular Quality Initiative® (VQI) database was used to review vein harvest technique of all patients undergoing single-segment great saphenous vein (GSV) graft infrainguinal arterial bypass from 2003 to 2013. Patients were assigned to three groups according to the VHT used (continuous incision, skip incision, and endoscopic). Multinomial logistic regression was performed to estimate group assignment propensity scores. Propensity score adjustment was included in multivariate analysis of surgical site infection (SSI) and graft primary patency.

**Results:** A total of 5066 patients underwent single-segment GSV graft infrainguinal bypass. The VHT was continuous incision in 48.6%, skip incision in 39.7%, and endoscopic in 12.7%. SSI rates did not differ significantly among the groups (continuous, 4.7%; skip, 4.0%; endoscopic, 3.4%; $P = .278$). On multivariate analysis, there was no difference in discharge primary patency among the three groups. One-year primary patency rates were 66.2% for continuous, 68.6% for skip, and 53.9% for endoscopic ($P < .001$). After multivariate analysis, endoscopic vein harvest independently increased the risk of 1-year primary patency loss compared with continuous (hazard ratio, 1.38; 95% confidence interval, 1.07-1.77; $P = .010$). There was no significant difference in 1-year primary patency loss between skip and continuous VHT. Endoscopic vein harvest also increased the risk of 1-year primary patency loss compared with skip (hazard ratio, 1.44; 95% confidence interval, 1.11-1.87; $P = .006$; Fig).

**Conclusions:** The choice of VHT had no effect on SSI rates in patients undergoing infrainguinal arterial bypass in the VQI population. Continuous and skip incisions resulted in equivalent 1-year primary patency, but endoscopic VHT significantly reduced 1-year primary patency.

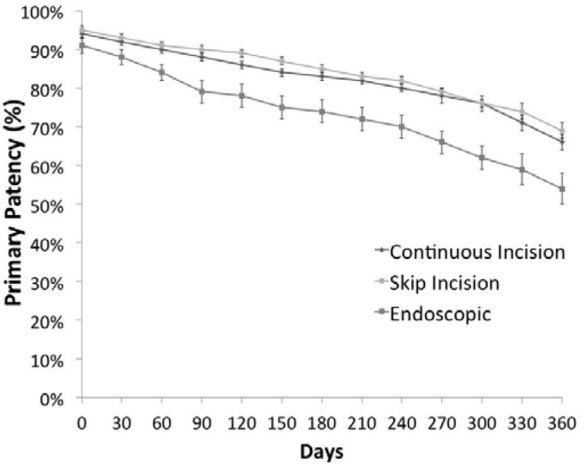


**Fig.** Primary graft patency rates according to vein harvesting technique.

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